

How to Protect Trees During Construction

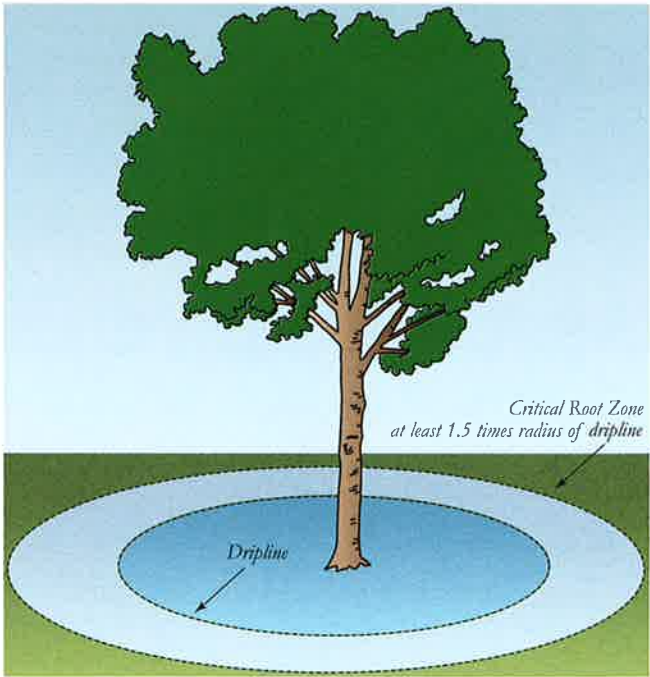
Preventing damage to trees during construction is not difficult or expensive. In fact, taking protective measures will probably cost less than replacing or treating a damaged tree.

Identify the Critical Root Zone (CRZ)

The Critical Root Zone (CRZ) is the area around a tree in which the roots necessary for the tree's survival are found. It includes large woody roots that transport nutrients and support the tree as well as the smaller roots of varying sizes that absorb nutrients. All these roots play an important role in the tree's health and survival.

The size of the CRZ can vary widely depending on the type of tree and site conditions, but it is almost always larger than the dripline (the outer perimeter of the leafy canopy). To approximate the CRZ, measure the diameter of the tree at 4½ feet from the ground. This is the Diameter at Breast Height or DBH. For every inch of DBH, allow 1½ feet of radius for the CRZ. A tree with a 10" DBH would have a CRZ radius of 15 feet.

Diagram of Critical Root Zone Determination



Use Smart Design to Avoid Tree Damage

Taking the following preventive measures during the planning and design process will help to limit damage to trees.

- Include the extent of the CRZ on any improvement plan designs to avoid placing built features in the CRZ.
- Allow plenty of room for construction staging and maneuvering outside of the CRZ.
- Identify a route for moving equipment and materials to and through the construction zone that avoids the CRZ.
- Locate built features far enough away from young trees to allow room for them to grow to their mature size.
- When possible, incorporate design features that limit disturbance to the CRZ, such as retaining walls, post and pier foundations, and suspended decks.
- If hardscape must go over portion of the CRZ, use permeable materials such as gravel, pavers, flagstone, etc., or an elevated boardwalk to limit compaction and allow air and water circulation.

Site Preparation

Before any construction activities begin, make sure the site (and the trees to be retained) are properly prepared.

- Identify any trees that are to be retained and use high visibility, durable fencing to demarcate CRZ areas. Ensure that fencing is maintained at all times during the construction process.
- Consider transplanting trees instead of cutting them down. Smaller trees (2" DBH and less, 10' tall or less) can often be successfully transplanted after proper pruning to reduce transplant shock. Larger trees can also be moved using tree spades, but this is often expensive.
- If some trees must be removed, use care not to damage the roots or crowns of nearby trees that will remain. Trees may need to be removed in sections from the top down, rather than by pushing them over to uproot them.
- Make sure trees to be retained are in good health with adequate watering, fertilizing, and proper pruning so they will be better able to tolerate construction related stressors.
- Clearly mark designated areas for wash-out, stockpiling, and materials storage well outside of the CRZ. Make sure runoff from wash-out areas is directed away from trees.
- Provide on-site training to construction workers to make them aware of designated access routes and staging areas.

Protection During Construction

After construction actually begins, many protective practices can protect trees from construction damage.

- Do not stockpile soil, construction debris, or materials within the CRZ, even temporarily.
- Make sure changes in site grading do not result in concentrating water flows into the CRZ or depriving trees of a source of surface water to which they have adapted.
- Do not alter the terrain or composition of the natural soil in the CRZ. This includes cutting, filling, or compaction. Such activities can sever roots, suffocate roots, expose roots to drying air, deplete topsoil, and create excessive pooling or runoff.



Make sure protective fencing is placed outside the dripline of all trees to be preserved

- When pouring concrete slabs or footings near the CRZ, use a 6 mil thickness layer of plastic to create a non-leaching barrier to protect trees from changes in soil pH.
- Avoid trenching through the CRZ and use tunneling instead. Tunneling should be at least 2 feet below the surface for trees with a DBH of 12 inches or less, and 3 feet below the surface for larger trees.
- If vehicular traffic or heavy loads must be transported across the CRZ, use ¾" plywood or a 6-8" mat of bark mulch to reduce soil compaction.
- If tree roots must be severed, make a clean cut with a sharp saw to minimize damage, discourage decay, and encourage new root growth. If a tree root is accidentally crushed or torn by equipment, make a clean cut immediately behind the ragged edge.
- Make cuts as far away from the tree as possible to minimize the mass of roots that will be destroyed.
- Keep exposed roots moist by wrapping them in damp burlap or by misting with a hose. Also protect exposed roots from sun exposure on hot, dry, or windy days.
- Do not attach ropes, nails, cables, wires or signs to protected trees.
- Keep vehicle exhaust and heat producing equipment away from tree foliage to prevent scorching or burning.
- Ensure that there is adequate clearance before using cranes, backhoes, or other equipment that could damage overhead tree branches.
- Carefully remove concrete, sidewalks, or curbs within the CRZ using manual methods to protect the roots that may be immediately under the surface.
- If any excavation work must be done in the CRZ, use hand tools, when feasible, to minimize the disturbance area.

Arborists are tree care professionals who can help with the proper selection, planting, and care of trees. We recommend choosing Arborists Certified by ISA (International Society of Arborists).

Master Gardeners are lay people who are trained to recognize many tree related issues and make general recommendations. The Master Gardeners are available through the University of California Cooperative Extension. More information about the Master Gardener Program in Placer County can be found at ceplacer.ucdavis.edu/Master_Gardener803/

Nursery Employees often have training in growing conditions and species selection for trees.

Some **Lawn Care Professionals** or **Gardeners** may also have training and experience in tree selection and care.

Where Can You Get Advice About Protecting Trees?

Useful Web Sites:

www.ISA-arbor.org and www.treesaregood.com
These sites are maintained by ISA and provide information about trees, tree care, and contact information for local certified arborists.

www.arborday.org/trees/righttreeandplace
The web site of the National Arbor Day Foundation provides information about tree selection and tree care.

www.ufe.calpoly.edu and selectree.calpoly.edu
The web site of the Urban Forest Ecosystems Institute at Cal Poly San Luis Obispo has tools, such as SelecTree, to help homeowners with tree selections and identification and diagnosis of diseases and pests that attack California native tree species.

www.placertree.org
Placer Tree Partners is a citizen based organization focused on increasing public awareness and appreciation of trees in an urban forest setting.

Garden Design Books and Magazines
Many books and magazine offer useful design tips and information about proper tree selection.

Being Careful is Critical

Construction activities can cause serious damage and even death to trees if proper measures are not used to protect the trees. Injuries to trees are not always obvious, and the decline of the tree may not be evident for months or years after the construction activities are complete. When such conditions do become evident, it is often too late to correct the damage, and tree loss or tree hazards may result.

Trees with trunk wounds are susceptible to diseases and pests



Trunk wound with advanced decay

Other publications in this series include:

- Mature Tree Care**
- Choosing the Right Tree**
- Young Trees — Planting and Care**
- Native Oaks and Other Native Trees**